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EXAMINER

MATHEWS, ALAN A

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/823,777	Applicant(s) KOLESNYCHENKO ET AL.	
	Examiner ALAN A. MATHEWS	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 April 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-20 and 22-48 is/are pending in the application.
- 4a) Of the above claim(s) 6,13,14,26,31,33,41-43 and 48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,7-9,12,15-20,22,23,25,27-30,32,34-36 and 47 is/are rejected.
- 7) ☐ Claim(s) 5,10,11,24,37-40 and 44-46 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6/11/10</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The Examiner acknowledges the Information disclosure filed June 11, 2010. The Examiner **has considered all the references cited therein including the U.S. Office Actions**, but has crossed out the U.S. Office Actions on the PTO-1449, since they are not publications.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 7, 8, 9, 12, 15-20, 22, 23, 25, 27, 28, 30, 32, and 34-36 are rejected under 35 U.S.C. 102(e) as being anticipated by Van Santen et al. (U. S. Patent Application Publication No. 2005/034815 A1). Van Santen et al. '815 discloses in figure 1 a lithographic apparatus with a support structure MT configured to hold a patterning device MA and a substrate stable WT configured to hold a substrate W. Element PL is

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the projection system. Figure 4 and paragraphs # 0052 - # 0062 disclose a liquid supply system 20 and 22 which supplies liquid to a localized area (see in particular paragraphs # 008 and # 0018 which discuss supplying to a **localized area** and **collecting liquid that has spilled from the localized area of the supply system**).

Figure 4 and paragraph # 0060 disclose an outlet 60 which removes immersion liquid that is spilled from the liquid supply system (which is similar in many ways to outlet "OUT" in figure 2 of the instant application). Outlet 60 would help confine the liquid to a localized area on the substrate, since outlet 60 is shown in figure 4 to be above the substrate W. **In addition to outlet 60, one or more outlets 63 and 66** may be provided on the top of the substrate table WT (see paragraph # 0060). With respect to claim 8, the one or more outlets 63 could be considered a plurality of discrete outlets.

A rim 50 (projection) may also be provided. Rim 50 in figure 4 is a barrier which comprises a projection which projects out above an upper surface of the substrate table and outlet 63 is considered to be a groove recessed into an upper surface of the substrate table. With respect to claims 12 and 25, element 66 is considered to be a further groove. With respect to claims 15, 27, and 28, element 66 is considered to be the drainage ditch or additional barrier, surrounding an outer peripheral edge of the substrate W. Barrier 50 and 63 is positioned radially outwardly of the drainage ditch 66. With respect to claims 16 and 35, barrier 50 extends substantially around an outer edge of portion of the substrate table. With respect to claim 17, figure 4 discloses that barrier 50 additionally surrounds areas of an upper surface of the substrate table which are not covered by the substrate W. With respect to claims 18 and 36, barrier 50 additionally

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surrounds sensor 70 and/or closure member 80. With respect to claims 7, 22, and 34, low pressure supply would remove liquid from the barrier.

With respect to Applicant's arguments, Applicant has stated that Van Santen et al does not disclose a liquid supply system configured to supply a liquid to substantially only a localized area of the substrate, the substrate table, or of both, to at least partly fill a space between the projection system and the substrate, the substrate table, or both, the localized area being less than the area of a surface of the whole substrate, wherein the supplied liquid is confined to the localized area, while in normal use, in a controlled manner except for uncontrolled escaping liquid. Applicant's system appears to have a localized liquid supply system that is not efficient and that **spills** liquid that **escapes** from the liquid supply system, with the result that the immersion liquid gets on the rest of the substrate or the substrate table. For example, Applicant states in paragraph # 0006 in the Background of the instant application "if a liquid supply system fails, **immersion liquid can easily escape. Furthermore, if the localized area liquid supply system is not efficient, immersion liquid can be left behind on the substrate table** and then can leave the substrate table under the forces generated by the acceleration of the substrate table". Applicant also states in paragraph # 0015 of the instant application "Using the barrier, **liquid spilt by the liquid supply system or escaping from the liquid supply system** may be collected----". Applicant further states in paragraph # 0024 of the instant application "The barrier extends essentially around an outer edge or portion of the substrate table. Thus, with any relative position of the liquid supply system on the substrate table, **the barrier can be used to collect**

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liquid which is spilled". Thus, Applicant's system appears to have a localized liquid supply system that is not efficient and that **spills** liquid that **escapes** from the liquid supply system, with the result that the immersion liquid gets on the rest of the substrate or substrate table. With regard to the rejection above, Van Santen '815 states in paragraph # 0018, "**In this way immersion liquid which has spilled from the localized area of the supply system (i.e. the area under the projection system) may be collected -----**". Thus, Van Santen '815 is also concerned with and discloses collecting liquid that **spills or leaks or escapes** from the localized area of the supply system. **In addition, outlet(s) 60 would help confine the liquid to a localized are of the substrate.** Paragraph # 0060 discloses that outlet(s) 60 remove liquid which has been spilled from the liquid supply system. Outlet 60 as shown in figure 4 is located above the substrate and **before the edge of the substrate W**, and thus would help confine the liquid to a localized area before the edge of the substrate. With respect to Applicant's arguments about figure 4, figure 4 discloses the spilling or leaking or escaping of liquid to outlets 66 and 63. Applicant's instant invention also discloses spilling or leaking or escaping of liquid to groove 110, but does not happen to have a drawing figure specifically showing the liquid extending to the groove 110 like figure 4 of Van Santen does. Van Santen further discloses in paragraph # 0059 "the **containment** under the projection system" when referring to immersion liquid. Paragraph # 0061 further discloses that "a meniscus can be formed between the barrier member 10 and the substrate table WT so that less liquid escapes ---". It is also noted that Applicant's specification has **not recited the terms "normal use" and "controlled manner"** and

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“**uncontrolled**” recited in Applicant’s independent claims, and therefore these terms would be given, at best, a very, very general interpretation, or a very, very broad interpretation. “**Normal use**” could be interpreted to mean any type of use of the apparatus.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 7, 12, 16, 17, 19, 20, 22, 25, 27, 28, 30, 32, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the International Publication W099/49504 (hereafter referred to as Fukami et al. ’504, which was cited by Applicant in one of his IDSs, and with a translation being provided by the Examiner in the Office

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Action mailed July 17, 2008) in view of the Japanese patent document JP 10-303114.

Fukami '504 discloses in figure 1 and page 6, lines 14-25, page 12, lines 14-24, and page 13, lines 1-26 of the English translation a support structure RST to hold patterning device R, a substrate table 9 and 10 to hold a substrate W, and a projection system PL. Figures 1 and 2, and page 15, lines 15-27, disclose a liquid supply system with a liquid supply 5 and discharge nozzle (inlet) 21a to provide an immersion liquid 7 to a localized area of the substrate, of the substrate table, or both, to at least partly fill a space between the projection system and the substrate, the substrate table, or both, the localized area being less than the area of a surface of the whole substrate. The supplied liquid is confined to the localized area, while in normal use, in a controlled manner except for any escaping liquid. Page 23, lines 21-24 of the translation disclose a **dividing wall** that encloses the wafer so that liquid does not overflow from the Z stage, and further discloses a **pipe for recovering liquid from within this dividing wall**. The dividing wall would be a projection. Thus, Fukami '504 discloses the invention except for the barrier (dividing wall) surrounding and spaced apart from the substrate having a groove recessed into an upper surface of the substrate table and having a projection which projects out above an upper surface of the substrate. The Japanese patent document JP 10-303114 discloses in figure 4 and paragraph # 0037, a barrier including a slot 51 which could be annular for discharging liquid. Annular slot 51 is considered to be a groove. The barrier slot or groove 51 is spaced apart from the substrate. Slot 51 is connected to a pipe 53 and to a pump 66 (which would be a low pressure supply). The Japanese patent document JP 10-303114 further discloses in figure 4 a projection

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LB. It is further noted that figure 5 discloses an areas HRS of an upper surface of the substrate table not covered by the substrate (claim 17). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide Fukami et al '504 with a groove and a projection in view of the Japanese patent document JP 10-303114 for the purpose of providing better liquid removal and thus having less spillage and thus producing a better final product.

6. Claims 3, 29, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified device of Fukami et al. '504 and the Japanese patent document JP 10-303114 as applied to claims 1, 19, and 28 above, and further in view of Novak (U. S. Patent Application Publication No. 2006/0023181 A1, cited in one of Applicant's IDSs). The modified device of Fukami et al. '504 and the Japanese patent document JP 10-303114 discloses the invention except for disclosing that part of the barrier comprises a **liquidphillic** material or coating. Novak '181 discloses in paragraphs # 0005 and # 0080 using a hydrophilic (liquidphillic) coating at 395 for the purpose of better liquid handling. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the barrier in the modified device of Fukami et al. '504 and the Japanese patent document JP 10-303114 with a liquidphillic coating in view of Novak '181 for the purpose of better liquid handling.

Allowable Subject Matter

7. Claims 5, 10, 11, 24, 37-40, and 44-46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The reasons for the indicated allowability of the claims are as follows:

The prior art does not disclose or suggest wherein the groove is sized such that the liquid can be transported along the groove under capillary action in combination with all the other elements recited in the parent claim to dependent claim 5.

The prior art does not disclose or suggest a surface acoustic wave generator configured to generate surface acoustic waves in the barrier to facilitate transport of liquid along the barrier in combination with all the other elements recited in the parent claim to dependent claim 10.

The prior art does not disclose or suggest further comprising generating surface acoustic waves in the barrier to facilitate transport of liquid along the barrier in combination with all the other steps recited in independent claim 24.

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The prior art does not disclose or suggest wherein the barrier comprises two collecting recesses at opposite corners of the barrier in combination with all the other elements recited in the parent claim to dependent claim 37.

The prior art does not disclose or suggest wherein the substrate table further comprises a chamber in liquid contact with the upper surface via the groove and the chamber is a continuous annular chamber which has a cross-sectional area larger than that of the groove in combination with all the other elements recited in the parent claim to dependent claim 40.

The prior art does not disclose or suggest wherein the barrier comprises two collecting recesses at opposite corners of the barrier in combination with all the other elements recited in the parent claim to dependent claim 44.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The patents cited in the PTO-1449 are cited for the same reasons they were cited in Applicant' IDS.

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9. Claims 6, 13, 14, 26, 31, 33, 41-43, and 48 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on January 16, 2007.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALAN A. MATHEWS whose telephone number is (571)272-2123. The examiner can normally be reached on Monday through Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alan A. Mathews/
Primary Examiner
Art Unit 2882

AM